C4I Interoperability

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C4I Interoperability

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"Information will become the prominent, if not predominant, part of war to the extent that whole wars may well revolve around seizing or manipulating the enemy's datasphere."
                                            John A. Warden, Colonel, USAF

The United States National Military Strategy states that joint force mission systems are to be "conceptualized and designed with joint architectures and acquisition strategies to ensure that technical, doctrinal and cultural barriers do not limit the ability of joint commanders to achieve objectives."[1] Despite this mandate, military service components continue to acquire, operate, and train with and maintain unique command, control, communications, computers and intelligence (C4I) systems, creating self-induced friction in the operating environment. Mission effectiveness is reduced, operations are slowed, and information from multiple systems is not delivered to the warfighter. A lack of standardized, interoperable systems and equipment between organizations creates a disjointed operational environment for commanders in charge of intra-agency, multi-service, and coalition operations. Although individual service components have made progress in developing advanced C4I systems, the warfighter's requisite for interoperability within

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[1] Chairman of the Joint Chiefs of Staff, *The National Military Strategy of the United States of America* (Washington, D.C.: GPO, 2004), 15.

the current expeditionary environment falls short in developing the human factors required for success.

INTEROPERABILITY DEFINED

Joint Publication 1-02 defines interoperability as "ability of systems, units, or forces to provide services to and accept services from other systems, units, or forces and to use the services so exchanged to enable them to operate effectively together."[2] The joint doctrinal definition of interoperability encompasses both a technical and an operational capability. The technical interoperability addresses issues of connectivity between systems, data exchange, networking, and other communication related scenarios. Essentially, technical interoperability ends at the system.

Operational interoperability addresses the degree to which value is derived from the technical capability. The strategic requirement for interoperability goes beyond the basic requisite to automate the exchange of information. Operational interoperability adds the user, "to include people and

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[2] Joint Publication 1-02, *Department of Defense Dictionary of Military and Associated Terms* (Washington, D.C.: GPO, 2001).

procedures,"[3] in the exchange. There must be a suitable focus on procedural and organizational elements, and decision makers at all levels must understand each other's capabilities and constraints. Ultimately, the goal of C4I is to have information move seamlessly within a chain of command, between the service commanders and other organization as required. Lessons learned from recent intra-agency, joint and coalition operations and debates over there degree of success emphasize insufficient operational interoperability despite technological advances.

EXPEDITIONARY OPERATIONS LESSONS LEARNED

OPERATION ALLIED FORCE

Despite unprecedented communications bandwidth and the diversity of services provided during Operation Allied Force, the deficiency of information interoperability created a major problem during both U.S. Joint operations and combined NATO operations. These shortfalls included "the lack of integrated data networks to support dissemination of coalition information, stove-piped databases, and the use of various classification levels to protect the information."[4] To mitigate this shortfall

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[3] Faughn, Anthony W., *Interoperability: Is it Achievable?*, October 2002, http://www.pirp.harvard.edu/pubs_pdf/faughn%5Cfaughn-p02-6.pdf.

[4] Department of Defense Report to Congress, *Kosovo Operation /Allied Force After Action Report*, (Washington, D.C.: GPO, 2000).

coalition partners established liaison teams that were exchanged along with their respective systems in order to share information. Despite this effort result, strike reaction times were often slow and diminished the coalition's ability to engage time-sensitive targets throughout the conflict.

OPERATION IRAQI FREEDOM

Early in the war in Iraq, the Army, its logisticians and the Marines all had different pictures of the battlefield because they had different computer systems and different security standards. "You could instantly see where you might have opportunity for friendly forces fratricide," said Maj. Gen. Michael Mazzucchi, the commanding general for the Communications-Electronics Life Cycle Management Command and program executive officer for command, control and communications technology during an speech at a Defense News Media Group conference on joint warfare.[5] As an interim solutions, the Army bought Marine systems and vice versa, but then commanders had to piece together a complete picture by looking at two different screens. This temporary solution was required simply because the services did not build an interoperable tactical workstation initially.

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[5] Lubold, Gordon, *Joint Success Requires All Services to Think About Capabilities Not Program*, Defense News.com, http://www.defensenews.com/promos/conferences/jw/1198511.html.

British, Australian and Polish senior leaders testified before the House Armed Services Committee offering insights into what did and did not work during Operation Iraqi Freedom. The problem of interoperability "was an issue that we thought a great deal about during my time out there last year,"[6] said Maj. Gen. Freddie Viggers, military secretary with the United Kingdom. Maj. Gen. Viggers, who served as the deputy commander Combined Joint Task Force-7, noted that the operation demonstrated the need to pull together the coalition intelligence and information in a much more coordinated way. Lt Gen. Mieczyslaw Cieniuch of the Armed Forces identified the requirement to "achieve common and integrating training before troop deployment"[7] in order to facilitate operational interoperability among twenty different countries using distinctive communications equipment and doctrinal procedures for command and control.

HURRACAINE KATRINA

Time is critical in natural disaster situations, and the ability for emergency personnel to communicate with each other is essential. The interoperability of communications systems will be stressed as all responders try to meet

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[6] House Armed Services Committee, *Issue Forum on Stability Operations by the Iraq Coalition*, May 2004
[7] Ibid.

operational requirements. The challenge present is that first responder units, as well as state, federal and DOD supporting agencies, will bring their own organic communications systems to the fight. This myriad of systems will need to cross not only intra-city boundaries but intra-state boundaries as well.

After Hurricane Katrina struck the Gulf Coast, about fifty thousand Army and Air National Guard members were sent to the states battered by the storm. The Guard was joined by more than ten thousand sailors and nineteen ships, 2,400 Marines, and units of the other military services and the Coast Guard.[8] Arrays of other government and agency groups were also on scene in the area of operations. The combined forces conducted search and rescue operations, delivered supplies, provided security and medical services, and performed countless other missions. Reliable communications were required to support command and control capabilities between Joint Task Force Katrina and the other agencies to complete these missions. Unfortunately several of the communications systems were out of date, not interoperable and operationally ineffective.

Lieutenant General H. Steven Blum, chief of the National Guard Bureau (NGB), told a House Defense Appropriations Subcommittee hearing in September that after Hurricane Katrina,

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[8] Kauchak, Marty, *Post Storm Static*, Military Information Technology Online, http://www.military-information-technology.com/article.cfm?DocID=1243

guardsmen using legacy radios were unable to talk to their active-duty counterparts who were equipped with more modern communications equipment. [9] Military communicators and first responders continue to look for solutions to remedy interoperability shortfalls and prevent a recurrence of the problems that occurred during the relief and recovery operations for Hurricane Katrina.

The lessons learned revealed give minute examples of the continuing problems with C4I interoperability across the broad spectrum of expeditionary operations the military is charged to support. Today's senior warfighters universally agree that operations are much more integrated today than in previous campaigns but the shortfall continue to deny the exploitation of success. In a testimony before Congress, Lt Gen William Wallance, who commanded the Army's V Corps, which captured Baghdad, said "despite all the incredible products at the disposal of my assault command post, we could not get relevant photos, imagery or joint data down to the soldier level in near real time. The

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[9] Ibid

opportunity to exploit intelligence to our advantage, to the advantage of the fire team in contact, was lost."[10]

FUNCTIONAL AREAS OF RESPONSIBILITY

Over the past two decades the DOD has instituted several initiatives in response to the shortfalls in C4I interoperability and their impact on future operations. The various organizational changes have promised to improve the prospect of achieving interoperability.

CONGRESS

In 2003, the House Armed Services Subcommittee on Terrorism, Unconventional Threats and Capabilities was given the responsibility for DOD information technology issues, the subcommittee has and continues to grapple with a multitude of the department's IT concerns. They include interoperability of various C4I systems, stove-pipe systems, redundancy, as well as capital planning investments in present and future IT systems. While the subcommittee has found some improvements in the department's efforts to streamline its IT planning and acquisition process, there is still much work that needs to be

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[10] **Saxton, Jim, "C4I Interoperability for Our Warfighters,"** *Military Information Technology Online Edition,* *http://www.military-information-technology.com/article.cfm?DocID=348.*

done. Particularly in the joint command and control area, where gaps still exists due to the lack of interoperability between each service's command and control system.[11]

UNITED STATES JOINT FORCES COMMAND (USJFCOM)

USJFCOM is tasked to help develop, evaluate, and prioritize the solutions to the interoperability problems plaguing the joint warfighter. At USJFCOM, joint interoperability and integration initiatives continue to deliver materiel and non-materiel solutions to interoperability challenges by working closely with combatant commanders, services, and government agencies to identify and resolve joint warfighting deficiencies.

In late 2004, U.S. Joint Forces Command assumed the role of primary conventional force provider. This landmark change assigned nearly all U.S. conventional forces to Joint Forces Command. The USJCOM scope of responsibility includes training. The key to enabling full interoperability is enabling the people and systems to work together in joint training. Joint training exercises are infrequent and each exercise involves operations with different equipment based on the units that are available and tasked to train together.

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[11] **Farrell, Lawrence, "Progressing Toward a Net-Centric Force,"** *National Defense Magazine,*http://www.ndia.org/Content/NavigationMenu/Resources1/ **Presidents_ Corner2/September_2003.htm, September 2003.**

UNITED STATES NORTHERN COMMAND (USNORTHCOM)

Planning support domestic disasters is one of the tasks of USNORTHCOM and its subordinate task force Joint Task Force Civil Support (JTF-CS). [12] JTF-Cass's mission is to plan and integrate the defense support to the designated primary federal agency for domestic chemical, biological, radiological, nuclear or high-yield explosive consequence management operations. JTF-CS is a 160-person standing joint task force stationed at Fort Monroe, VA. One of the tasks of the director of command, control, communications and computer systems, JTF-CS/J6, is to plan how the responding Department of Defense forces will communicate with all first responding forces in order to support their efforts.

CONCLUSION

As technological advances continue to occur at the service component level, joint interoperability initiatives have been instituted to enhance management oversight, to provide vision, to highlight major shortfalls, to test systems and, to showcase enhancement. However, these measures have not eliminated the problem completely. Major challenges continue to continue as the military is engaged in continuous complex involving joint,

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[12] Lefante, Babette, *Disaster Communications*, Military Information Technology Online, http://www.military-information-technology.com/article.cfm?DocID=1244

multi-national and intra-agency operations. The overall effectiveness of multinational operations is significantly dependent on interoperability between organizations, processes, and technologies.

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